No. 11. — *Reports on the Results of Dredging, under the Supervision of* Alexander Agassiz, *along the Atlantic Coast of the United States, during the Summer of* 1880, *by the U. S. Coast Survey Steamer "Blake,"* Commander J. R. Bartlett, U. S. N., Commanding.

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XII.

Report on the Selachians, by Samuel Garman.

This notice includes only what were taken during the last cruise of the steamer, with a few shoal-water species previously obtained. No attempt having been made to secure the latter, the collection is small. A single new species and a new variety were found among the captures in depths of less than thirty fathoms. All those coming from great depths appear to belong to species heretofore unknown. The notes secured on the different expeditions, as far as they relate to the Selachians, are by themselves insufficient for purposes of generalization. In connection with those taken from the results of other work, on Fishes as well as Selachia, they seem to point toward the following conclusions : —

First, That the migrations of these animals, including the fishes, are much more limited in extent than has generally been supposed ; and,

Second, That these creatures are more or less affected by a period of comparative inaction, in a measure corresponding to what obtains among Batrachia and Reptilia, most pronounced, perhaps, in the case of such as the skates.

Among both Selachians and Fishes there are many species in our waters whose movements do not amount to more than short runs from shoal to deeper water and back again. Others would seem to extend their travels from the coasts and banks to the Gulf Stream. And still others make much more extensive migrations. It is only a question of time and further investigation to enable our fishermen to follow their game with nearly as much certainty as the hunter now follows his, from highlands

or lowlands, north or south. The question of inaction may prove a considerable factor in determining the profits. Other things being equal, those whose wanderings are shortest are most to be depended on, since their movements are less likely to change direction, or, being changed, are more easily followed. Something of the nature of a marine signal service will be necessary in order to follow the more erratic. It is often the variation in direction and extent of their journeys that causes the apparent scarcity of different kinds in particular localities, during certain seasons, rather than decrease in numbers. The motions of the sharks which wander most are to a greater or less degree determined by those of the fishes upon which they feed.

Carcharias (Prionodon) obtusus.

Squalus obtusus, Poey, 1858. Mem. Cub., II. 337.
Squalus platyodon, Poey, 1858, l. c. 331.

Through the exertions of Lieut. S. M. Ackley and the boatswain, Peterson, we were able to examine a number of large specimens. Several adult females bore young nearly ready for delivery. When in the water the tips of the fins of the large ones appeared white ; on deck the color was much more dull. The fins of the young were also lighter toward the extremities, but each was marked with a small black spot on the very end. The lobes of the pectorals and dorsals were broadly rounded at the tips. The pectoral did not quite reach to the hinder extremity of the base of the dorsal. From the base of the first dorsal to the hinder end of that of the second, the distance was just twice the length of the former.

Each female had nine young ones. This was during the last week in January, and probably two or three weeks before parturition, which would place the time of the appearance of the young in February. The little ones were about sixteen inches and a half in length, perfectly formed, and it does not seem possible that their birth was anticipated more than a week or two. When the cord was cut they were quite snappish, and swam away as if able to take care of themselves. In one case several dead ones, far advanced in decomposition, were found in the oviducts among the living, which did not appear to have suffered from their presence.

One to several specimens of an *Echeneis*, which I take to be *E. remora*, were taken with each large shark.

Cuba ; Santa Cruz ; Guadaloupe ; Dominica.

Zygæna tiburo, Val.

Numbers of hammerheads of this species were found among the fishes killed by "the epidemic," and strewn along the shores of Florida Keys.

Scyllium retiferum, sp. nov.

Moderate, portion behind the vent longer ; head depressed, width nearly equal to its length in front of the spiracles. Distance across the head at anterior angles of eyes, from angle of eye to end of snout, between angles of mouth, between outer angles of nostrils, or between angle of nostril and that of mouth, about equal. Shape of body similar to that of *S. canicula*. Snout moderate, length from mouth less than the distance between the outer margins of the nostrils. Nasal valves separated by an interspace of less than their width, not reaching the mouth, somewhat folded, without a free cirrus. Mouth medium; the height of the irregular arch formed by its outline is little more than half its width. Labial fold on lower jaw extending nearly one fourth of the distance to the symphysis ; fold on upper jaw rudimentary. Teeth small, alike on upper and lower jaws, bearing a sharp central cusp, on each side of which are two smaller ones, several series in function at the same time. No nictitating membrane. Spiracles small. Gill openings small, fourth and fifth over the base of the pectoral. Pectorals moderate, broad, short, anterior margins curved, extremities rounded. Ventrals rather small, united for a short distance behind the claspers, outer extremity broadly rounded, posterior angle acute. First dorsal much larger than the second, about twice the length of its base in advance of the latter, extending forward above the free portions of the ventrals, insertion very near the middle of the total length. Second dorsal smaller than the anal, which extends below the anterior half of its entire length, not reaching the caudal. Caudal not large, a shallow notch between its upper and lower lobes, upper slightly indented on its hinder margin. Scales of shagreen small, unequal ; on those of the back there are three or five carinæ, the median of which is prolonged into an acute point.

Light brownish, or reddish brown, crossed at irregular intervals by groups of two to four narrow black lines which are joined toward the flanks by short lines in such manner as to enclose polygonal spaces, thus forming a network in which the meshes vary exceedingly in size and shape. Uniform light yellowish below.

Total length 12.25 ; snout to vent 5.75 inches.

One specimen. Lat. 38° 22′ 35″ N. ; Long. 73° 33′ 40″ W. ; 89 fathoms.

Ginglymostoma cirratum, M. & H.

One specimen from Kingston, Jamaica.

Narcine punctata.

Var. *N. brasiliensis* = *N. brasiliensis*, Var. 1, M. & H.

Specimens belonging to this variety were taken at St. Vincent. Compared with others from the east coast of South America it appears to depart more

from the circular in the outline of the disk, the portion in front of the head being slightly produced. The posterior outlines of caudal and dorsals are more convex than in the variety *corallina*, and less so than in the Rio Janeiro specimens.

Uniform leaden or olive brown, with the markings outlined by a series of small round spots. This is probably what was considered by Müller & Henle and Duméril the first variety of the species.

Narcine corallina.

Var. nov. *N. brasiliensis.*

Two adult males belonging to this species which were taken at Key West differ in a marked degree from those secured at Rio Janeiro.

Ground color orange or reddish; a dark brown band across the head in front of the eyes, interrupted on the forehead ; a large triangular space of the light color on the snout in front of the dark band. The other dark markings behind the frontal band are reduced in size and indicated only by the margins, which are incomplete, or merely series of small round spots. All the dark color on the body is much faded, the band upon the head alone being very distinct. Posterior borders of caudal and dorsals truncate.

The truncation of the fins and the colors are the striking characters of this variety. Were it not for the excessive amount of individual variation in species of the genus I should have little hesitation in classing these specimens as representatives of a distinct species.

Raja Ackleyi, sp. nov.

Disk including the ventrals rhombic, longer than wide, anterior margins sinuous, posterior outline convex ; tail moderate, depressed, with a narrow cutaneous fold on each side, tapering. The angle formed by the snout is less than right. Rostral cartilage rather slender. Mouth moderate, much curved, width one and two thirds times in distance from end of snout. Teeth small, cusps sharp, in forty-two rows on the upper jaw (male adult). Eyes moderately large, interorbital space narrow, deeply concave, width three times in the distance from the end of the snout to the eye. Spiracles smaller than the eye. Ventrals medium, portion in front of the notch rather small. Dorsals small, separated by a space with tubercles. A vertebral series of small tubercles on back and tail ; two lateral series on each side of the tail ; a series on each orbital ridge ; a group of several above the end of the rostral cartilage ; a group on each pectoral opposite eye and spiracle ; a group of retractile spines opposite the shoulder near the outer angle of the pectoral. Excepting the above, in this specimen, the disk is smooth on the upper surface. The ventral surface is smooth, with the exception of the portion anterior to the mouth which is covered with fine sharp scales or shagreen.

. Differing from *R. eglanteria*, which it resembles in shape, in a somewhat shorter snout and in coloration.

Disk, including ventrals, 9.5 ; width 9 ; tail from vent 9.6 ; and total length 16.25 inches.

Light yellowish brown, sprinkled with small spots of brown intermixed with others of white. On the base of each pectoral a little behind the shoulder girdle there is a transversely oblong spot of brown, half an inch in diameter, surrounded by a ring of small spots forming a sort of rosette. Uniform white beneath. Named for Lieut. Seth M. Ackley, U. S. N., to whose energy and enthusiasm we were indebted for much valuable assistance.

Yucatan Banks.

Raja ornata.

Var. nov. *R. Ackleyi.*

Disk, including the ventrals, little broader than long, anterior margins convex at the extremities of the pectorals ; tail depressed, becoming quite slender backward, with a narrow cutaneous fold on each side. Rostral angle obtuse. Snout not produced beyond the convex margins on each side of it. Rostral cartilage slender, acute. Mouth medium, moderately curved, width one and one third times in the distance from the end of the snout. Teeth small, smooth, in forty-four series in the upper jaw (young male). Eyes large, interorbital space more than three times in their distance from the end of the snout. Spiracles smaller than the eye. Ventrals medium ; posterior portion elongate, anterior small. Dorsals small, separate. Hinder margin of pectorals rounded. A vertebral series of spines on back and tail ; one lateral series on each side of this on the back, and two on the tail ; a series on each orbital ridge ; a single spine on the forehead between the eyes ; a group of several above the end of the rostral cartilage ; a spine on each shoulder ; a group near each ventral on the hinder angle of the pectoral, and a group on the anterior extremity of the latter. Entire upper surface rough with small sharp asperities ; smooth below.

Disk to end of ventrals 4.5, width 4, tail from vent 4.6, and total length 8 inches.

Light brownish, freckled with lighter, marked with scattered rosettes or groups of small spots of darker. One of these groups stands on the pectoral a little back of the shoulder, a couple near the hinder angle, and one opposite, or a little behind the spiracle. White beneath. Several spots on the tail ; one at the base of each dorsal.

One specimen off Alligator Key, Florida ; 138 fathoms.

Three specimens, Lat. 32° 24′ N., Lon. 78° 44′ W ; 142 fathoms.

Of the latter, one has only the vertebral series of spines well developed ; another has the vertebral and one lateral on each side ; and the third has the three series and scattered spines in the second lateral. One has a third dorsal considerably in advance of the usual pair, near the middle of the length of the tail. Tail extending behind the dorsals in a slender point. At present it

seems likely that these young skates represent a variety of *R. Ackleyi*. Whether they are more distinct can only be determined by comparison of adults and young of each.

Raja plutonia, sp. nov.

Disk, including ventrals, broader than long, subquadrangular, broadly rounded in front and on the lateral angles ; snout forming a very blunt angle ; margin opposite the gill openings nearly straight. Tail about one and one half times the length of the disk, slender, depressed, with a cutaneous fold on each side near the extremity. Rostral cartilage short, not extending to the end of the snout. Mouth moderate, slightly curved, width equalling the distance between the outer angles of the nostrils, and contained twice in its distance from the end of the snout. Teeth about thirty-two series (a young specimen). Eyes large, longitudinal diameter of orbit greater than their distance apart. Interorbital space concave, narrow, width rather more than two and one half times in the distance of the eyes from the end of the snout. Spiracles small. Anterior nasal valve tubular ; posterior reaching the mouth, free on its outer margin. Hinder extremity of pectoral broad, rounded. Ventrals deeply notched, anterior portion narrow, extending farther from the middle of the pelvis than the posterior. Dorsals small, near the end of the tail, radial portion of bases narrow, anterior fin connected with the base of the posterior by a membranous expansion, posterior reaching almost to the extremity of the tail.

Back and tail covered with small, closely set, stellate-based scales, which bear elongate, slender, compressed, backward-directed points. Larger spines form a supraorbital row, and a single one stands on each side of the back of the head. The largest on the body form a close vertebral series on back and tail. On each side of the shoulder girdle there is an irregular series of five, and a short distance in front of each of these stands one or a pair. On each side of the tail there are two series, little smaller than those of the medial row. Smooth below. Very small specimens have not so many spines.

Brown, grayish in small to purplish in the largest specimens at hand, with more or less irregular transverse series of indistinctly defined spots of brown, often confluent into short bands, interspersed among which are spots of white of varying size and shapes. Tail with cross bands of light and of dark. Dorsals dark. Entire lower surface white.

The following measurements are taken from the largest. Width of disk 4.5 ; length of disk, including ventrals, 4.25 ; snout to hinder margin of vent 3.38 ; vent to end of tail 6.38, and total length 9.76 inches. The smallest specimen has a total length of 2, and a length of disk of .8 inches.

	Lat N.	Long. W.	Depth.	No. of Cast.
1 ex.	31° 57′ 0″	78° 18′ 35″	333 fath.	CCCXVII.
5 ex.	32° 7′ 0″	78° 37′ 30″	229 "	CCCXVI.
1	Without locality.			
1	32° 43′ 25″	77° 20′ 30″	233 "	CCCXXI.

If it is found to be the case that the rostral cartilage remains undeveloped in larger specimens, this species will have to be placed in the subgenus *Malacorrhina*.

Dasibatis sabina.

Many of these rays were found among the multitudes of dead fishes along the shores of Key West and islands in the neighborhood. Like the sharks and trunk-fishes (*Ostracion*) they seemed to possess much more vitality than the majority of the bony fishes. It was not an uncommon occurrence to find them struggling along in a feeble, half-paralyzed way, fully aware of their danger, but unable to make the efforts necessary for escape. In all likelihood they had been swept down from the bays and rivers of the mainland by the currents.

March 15th, 1881.